DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular and Supplementary Summer 2024

Course: B. Tech **Branch: Electrical Engineering and Allied** **Semester: IV**

Subject Code & Name: Analog and Digital Electronics BTBS404

Max Marks: 60 **Date: 20/06/2024** **Duration: 3 Hrs.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *Use of non-programmable scientific calculators is allowed.*
3. *Assume suitable data wherever necessary and mention it clearly.*

Marks

Q. 1 Solve Any Two of the following.

A) Explain the various operations of regions of a transistor in CE configuration on its output characteristics. 06

B) What are different methods of transistor biasing? Explain any one in detail. 06

C) The h parameters of a transistor used in a single stage amplifier circuit are h_{ie} = 1100, h_{re} = 1, h_{fe} = -51, h_{oe} = 25μA. Determine the amplifier parameters for CC configuration when $R_s = R_L$ = 10 kΩ. 06

Q.2 Solve Any Two of the following.

A) What are various characteristics of an ideal Op-Amp? Discuss in details. 06

B) Draw the block diagram of an Op-amp and explain the purpose of using each block. 06

C) Explain Op-Amp as a differentiator with neat circuit diagram and necessary equations. 06

Q. 3 Solve Any Two of the following.

A) Convert the following numbers: 06
   a) $(1101101.101)_2$ = (?)$_{10}$
   b) $(126.75)_{10}$ = (?)$_8$
   c) $(375.75)_{10}$ = (?)$_{16}$

B) Solve the following arithmetic operations 06
   a) Subtract $(15)_{10}$ from $(10)_{10}$ using 2's compliment method of binary subtraction.
   b) Subtract $(14)_{10}$ from $(18)_{10}$ using 1's compliment method of binary subtraction.

C) Explain all logic gates with their symbols, output expression and truth table. 06

Q.4 Solve Any Two of the following.

A) Explain TTL NAND gate circuit (Totem Pole Arrangement) with the help of circuit diagram. 06

B) What is meant by MOS logic family? Explain working of NAND gate by NMOS logic. 06

C) Explain J-K flip-flop with circuit diagram and truth table. 06

Q. 5 Solve Any Two of the following.

A) Reduce the expression for $f(A, B, C, D) = \Sigma_m (0,1,2,3,5,7,8,9,11,14)$ using K-map. 06

B) Explain half adder circuit with the truth table. 06

C) Reduce the expression for $f(A, B, C, D) = \pi M (2,3,4,5,6,7,8,11,12)$ 06

***** End *****